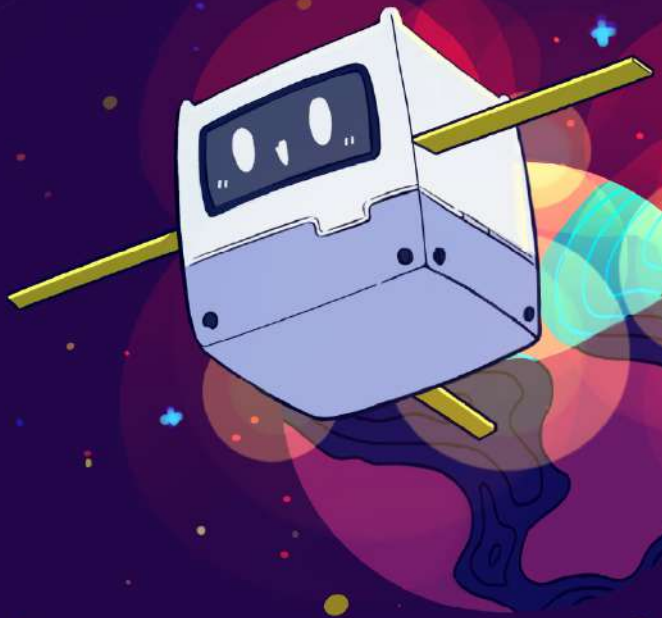
VIETNAM ACADEMY OF SCIENCE AND TECHNOLOGY
VIETNAM NATIONAL SPACE CENTER

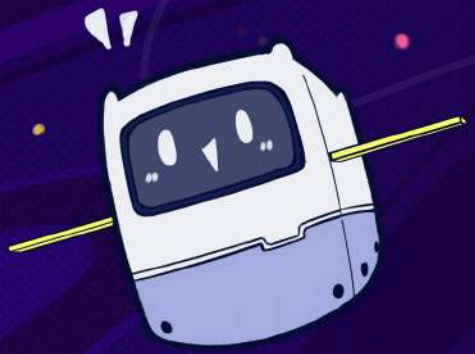


PicoDragon

Reach out for space

Based on the real story of PicoDragon, the first made-in-Vietnam satellite to operate in space.

PUBLISHING HOUSE FOR SCIENCE AND TECHNOLOGY



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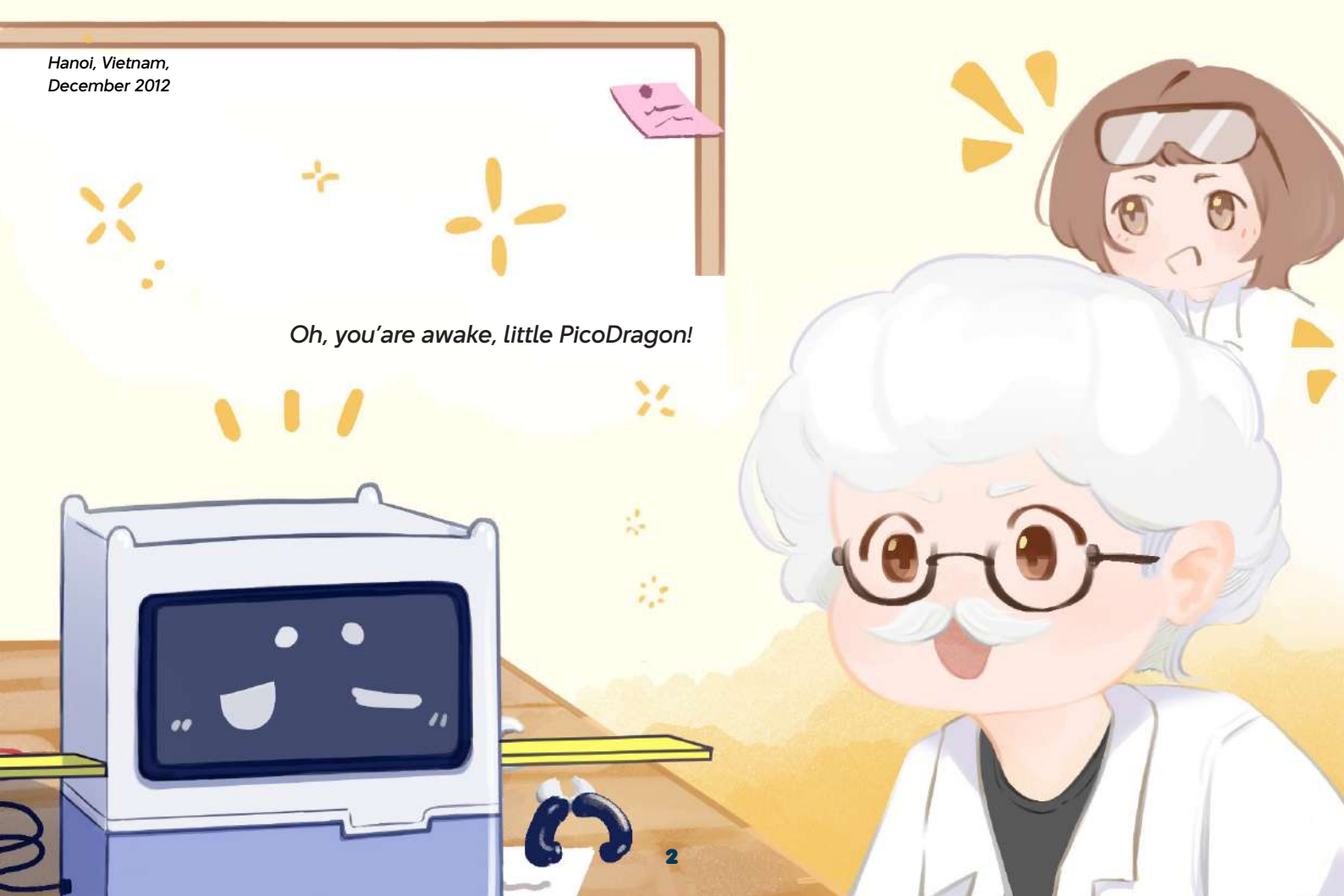
Beep beep beep beep beep
.....
Quake in Japan. Hurry up!
Please send support!
There is a flood in China.
Wildfire in Australia.
Help! Help!
What was all that noise?
Vietnam
1


Hanoi, Vietnam,
December 2012
Oh, you’are awake, little PicoDragon!

Wow, PicoDragon! Sounds kinda cute!
Anyways, where am I?
Well! This is Vietnam National Satellite Center(1). You are a satellite(2) made by all the engineers here.

(1) *Vietnam National Satellite Center: is the formal name of Vietnam National Space Center before 2017.*
(2) *Satellite: is an object that circles around a bigger object in space.*

Why do I keep hearing those voices in my head?

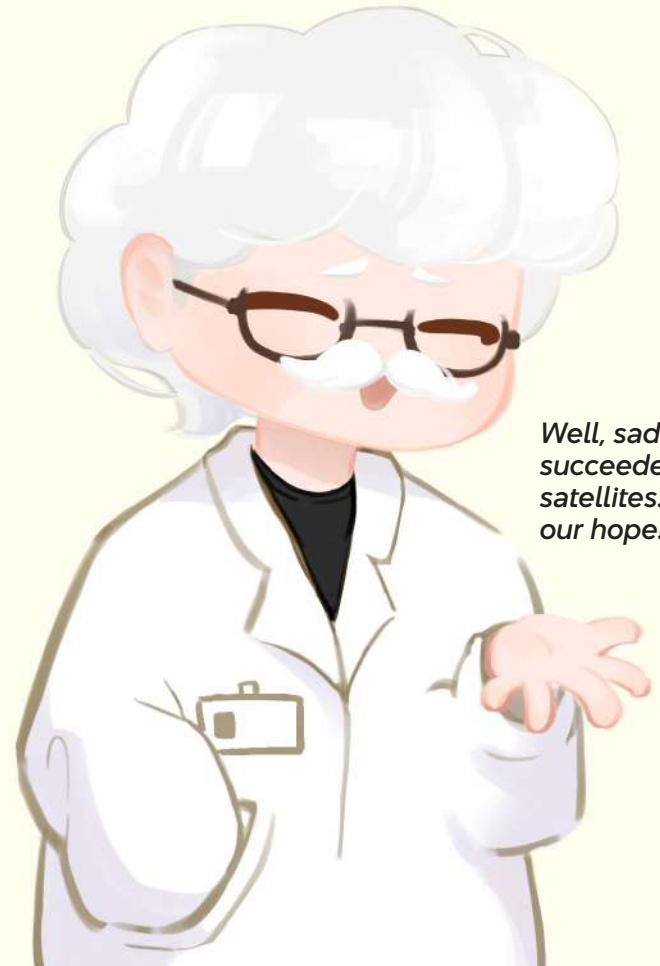
The voices you heard were from Sentinel satellites from Europe, Landsat satellites from the US, Himawari satellites from Japan[3] *and many more from other countries in the world. Their orbits*[4] *are typically hundreds of miles above the Earth's surface, so they could look and observe things that people on Earth could not see.*

[3] *Sources: ESA, NASA, JAXA.*
[4] *Orbit: is the repeating path of an object circling another object in space.*

But how could they help?

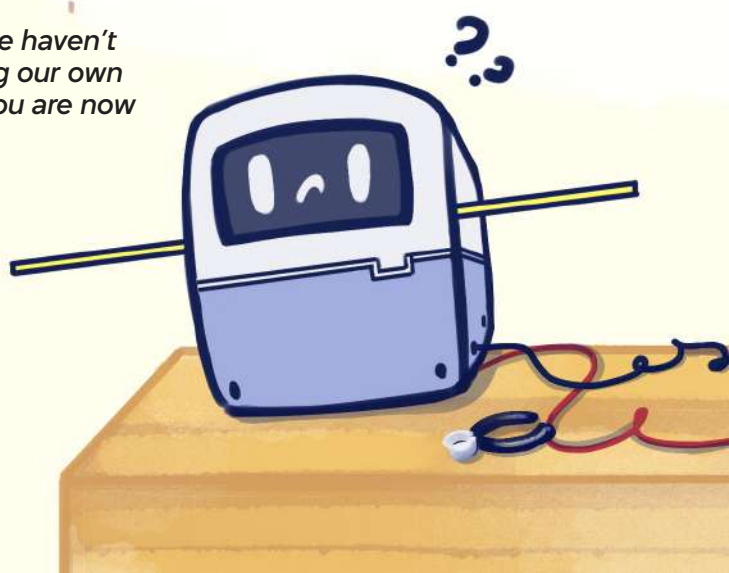
They carry all sorts of cameras, sensors, and other instruments that take different types of images and detect different types of factors that help to analyse, forecast and report on natural disasters such as earthquakes, tsunamis, typhoons, floods, wildfires, etc. And when someone's in need of help, they'll point out the location and let us know so we send support, rescue or protection. That's how we make the world a better place for everyone.

Don't you know you also have a camera and a 3-axis angular sensor?

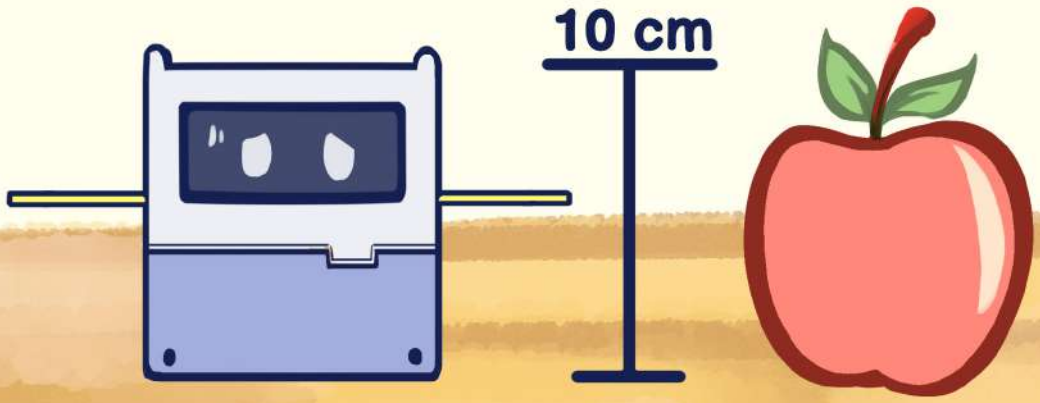


Well, sadly up to now, we haven't succeeded in developing our own satellites. PicoDragon, you are now our hope!

That's cool! Do we have Vietnamese satellites up there like them?



Oh! We've got lots of natural disasters in Vietnam too. I wanna help the people in our country. I wanna fly. Doctor, could a dragon as tiny as me - only 10 cm each edge and less than a kilogram - be of any help?

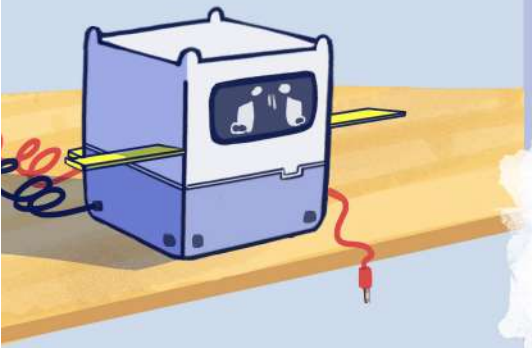


Well, little dragon, no matter how huge or tiny you are, you can always take part, as long as you've got a brave heart.

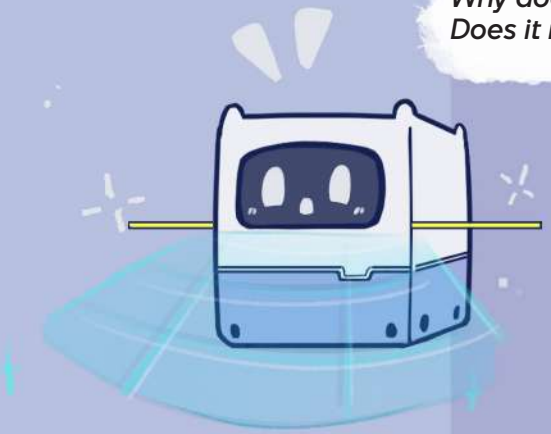
I am brave. And I really wanna help. Please!!! Doctor!
You seem eager! Let me see... I've got some good friends in Japan. Let me contact them to see whether any of them can help.

Many days passed!!!

Will there be any chance for me?



A month passed...



Let's see what I can do. Now, the doctor said I've got a camera and a sensor. My camera can take pictures. My 3-axis angular sensor can help detect my position. Wow!

Several weeks more...

Why does it take so long? Does it mean no opportunities?

One day in February, 2013

PicoDragon are you there? I've got some news for you!

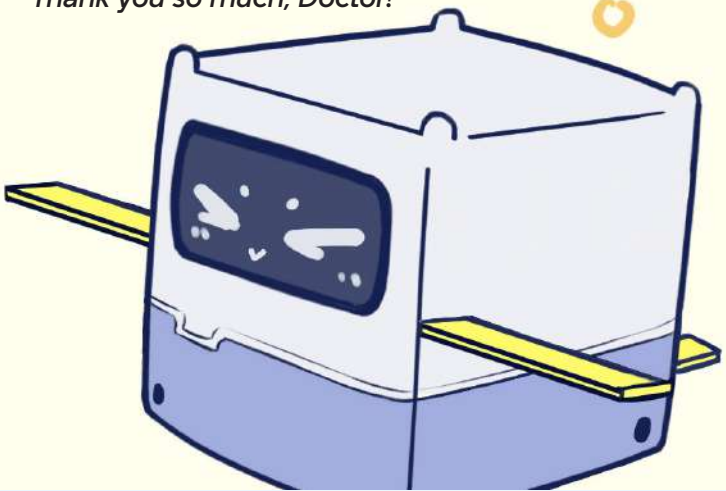
The Japanese Aerospace Exploration Agency[5] *has agreed to take you to the International Space Station. Then you'll be released up there. You will orbit the Earth at an altitude of 410 km. But before that you've got to go through their reviews and tests. Let's prepare you for the long trip now!*

[5] *Japan Aerospace Exploration Agency (JAXA).*

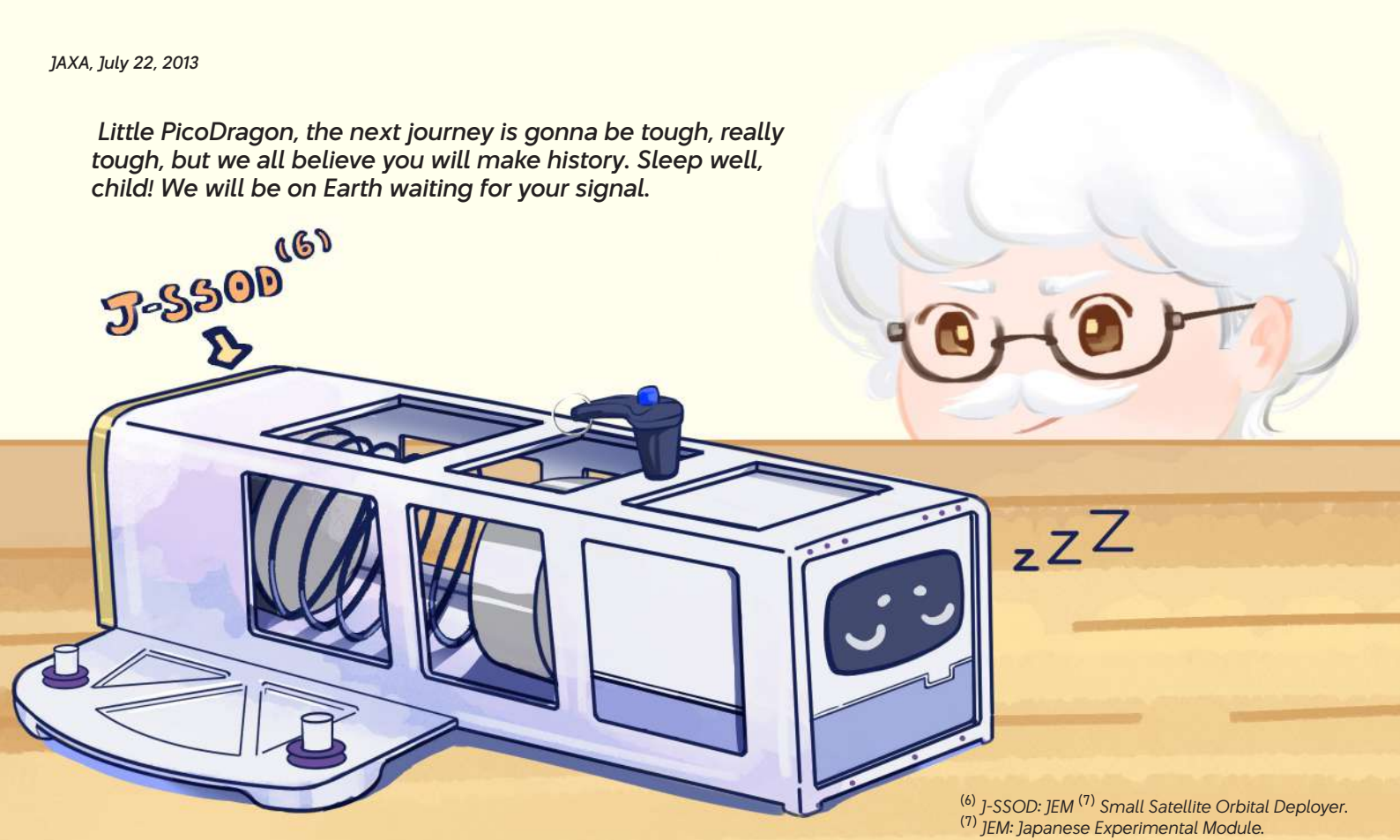
TSUKUBA SPACE CENTER,
JAXA, JAPAN
May 22, 2013

Congratulations! You've passed all the tests! Now let's wait for the launch!

Wow! I am so excited!
Thank you so much, Doctor!



Little PicoDragon, the next journey is gonna be tough, really tough, but we all believe you will make history. Sleep well, child! We will be on Earth waiting for your signal.



(6) *J-SSOD: JEM* (7) *Small Satellite Orbital Deployer.*
(7) *JEM: Japanese Experimental Module.*

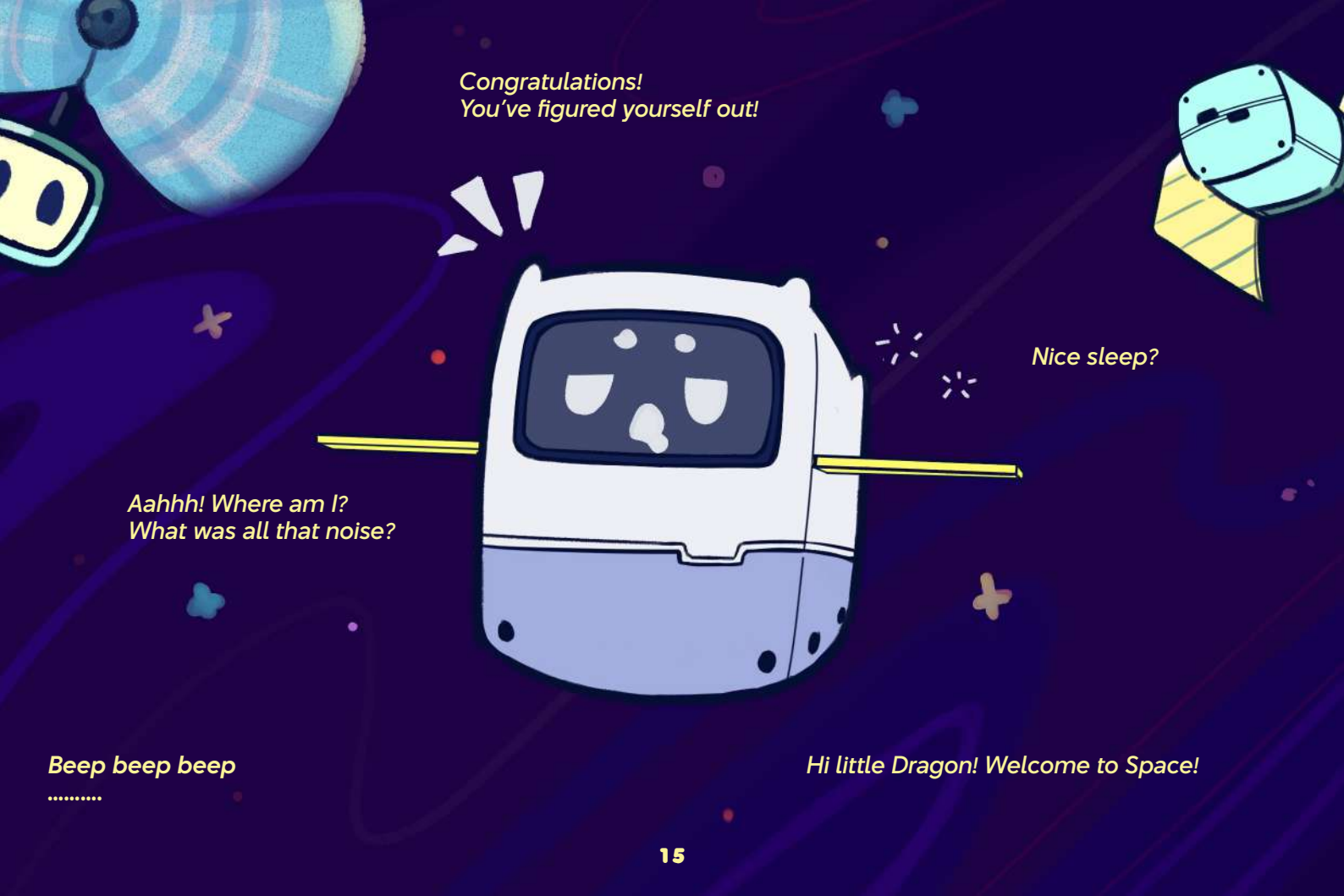
TANEGASHIMA SPACE CENTER
02:48, August 4, 2013 (Vietnam time)

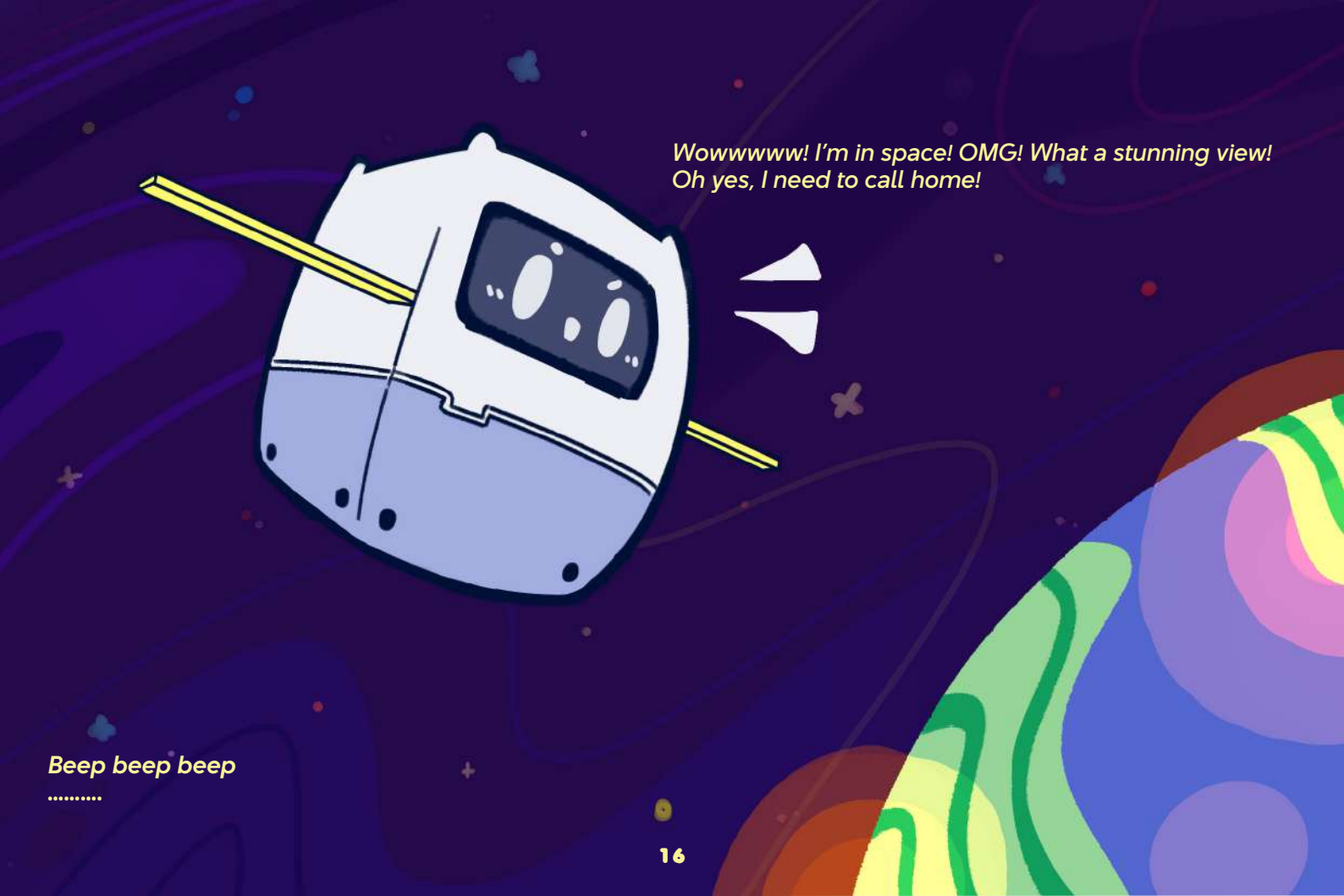
On the HTV4 cargo ship launched into space by H-IIB rocket, our little PicoDragon was still sound asleep, waiting for its turn to be released into orbit.

INTERNATIONAL SPACE STATION
19:17, November 19, 2013 (Vietnam time)

Finally, on November 19, 2013 our little PicoDragon and his two little friends were released to their orbits from the Japanese Experimental Module's Small Satellite Orbital Deployer (J-SSOD).

Look! We've got a tiny li'l dragon up here.
How cute!
Hey buddy!
ZZZZ
Beep beep beep
.....
Wake up! Dragon!


Congratulations!
You've figured yourself out!
Nice sleep?
Aahhh! Where am I?
What was all that noise?
Beep beep beep
.....
Hi little Dragon! Welcome to Space!

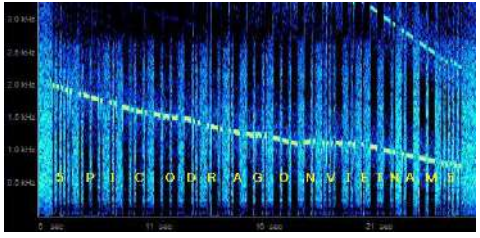

Wowwwww! I'm in space! OMG! What a stunning view!
Oh yes, I need to call home!
Beep beep beep
.....

Riiiiiiing... riiiiiiing...! Hello from Space!
This is PICODRAGON from VIETNAM!
...PICODRAGONVIETNAM...
...PICODRAGONVIETNAM...
...PICODRAGONVIETNAM...
Beep beep beep
.....

Japan, November 20, 2013

01:08-01:17 am, Japan time, the first signal from PicoDragon was captured at Mineo Wakita station. Later on the same day, Nihon University and Kyushuu Institute of Technology also heard its signal at 01:15-01:31 and 02:44 respectively.

First signal



Decoded signal from PicoDragon (Source: JE9PEL)

Vietnam, November 20, 2013

02:36-02:42 am, Vietnam time

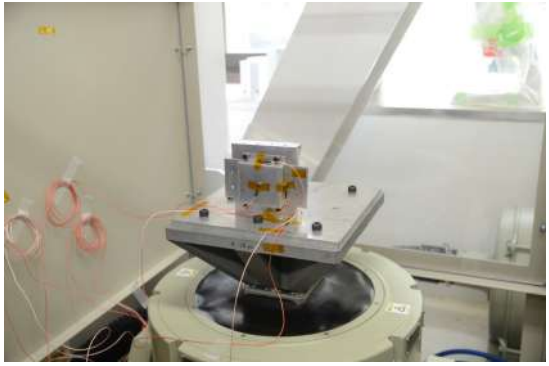
Ground Station located in Vietnam National Satellite Center

Hooray! It's alive. It made it. Yesssssss!

On the 20th of November, 2013, our little PicoDragon satellite made history. It became the first made-in-Vietnam satellite to successfully operate in space. Its signals were received in many locations around the world and were decoded to sequences of numbers and letters that wrote "PICODRAGONVIETNAM5". That was the very first step of satellite development in Vietnam.

ACTUAL MEMORIES OF PICODRAGON

PicoDragon, completed by a group of young engineers from Vietnam National Satellite Center (currently Vietnam National Space Center)



PicoDragon during vibration test in the University of Tokyo

PicoDragon, ready for the tests in Japan

PicoDragon inside the JEM Small Satellite Orbital Deployer (J-SSOD)

The launch of H-IIB rocket

PicoDragon pushed into orbit from J-SSOD

PicoDragon inside the J-SSOD vs fully deployed

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